

**A NEW SPECIES OF *OPODIPHTHERA* WALLENGREN
(LEPIDOPTERA: SATURNIIDAE)
FROM NORTHERN AUSTRALIA**

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Abstract

Opodiphtera excavus sp. nov. and its mature larva are described from northern Australia. The hostplant is *Erythrophleum chlorostachys* (F. Muell.) (Caesalpinaceae) and the larva spins its cocoon and pupates in the soil, a behaviour newly recorded for the subfamily Saturniinae.

Introduction

Recent collecting utilising mercury vapour lights produced 10 specimens (9 males, 1 female) of an undescribed species of *Opodiphtera* Wallengren from widely separated localities in northern Australia. During February 1993, mature larvae were discovered at Wolfram Camp, 27 km. north-west of Dimbulah, Qld, feeding upon the Cooktown Ironwood Tree *Erythrophleum chlorostachys* (F. Muell.) (Caesalpinaceae) and pupating in the soil. During September 1994, pupae were found in similar situations 8 km NE of Walkamin, via Atherton, Qld, and more recently pupae and empty pupal cocoons were found in an area 50-70 km east of Georgetown, as well as near Mt Surprise, Qld.

In Australia the Saturniidae are represented by 12 named species referred to four genera of the Saturniinae. *Opodiphtera* contains nine species formerly contained in *Antheraea* Hübner, with a known distribution extending from the Northern Territory and northern Queensland to Victoria, South Australia, southern Western Australia and Tasmania (Common 1990).

Opodiphtera excavus sp. nov.

(Figs 1-4)

Type Material. QUEENSLAND: Holotype ♂, Wolfram Camp, 27 km NW of Dimbulah, bred ex pupa, 10.iv.1993, D.A. Lane, in Australian National Insect Collection (ANIC), Canberra. Paratypes: 1 ♀, same data as holotype but 12.iii.1993; 1 ♂, same data but 9.iv.1993; 1 ♀, same data but 28.ii.1993; 1 ♂, 11 miles S of Ravenshoe, 2700 ft, 20.iii.1964, I.F.B. Common and M.S. Upton; 1 ♂, 15°41'S 145°12'E, Annan River, 3 km W by S of Black Mt., Cooktown, 27.ix.1980, E.D. Edwards; 1 ♂, 12°40'S 142°40'E., Batavia Downs, 22-23.viii.1992, at light, P. Zborowski & J. Cardale, ANIC slide No. 3412; 1 ♂, 12°37'S 141°55'E, Dinah Creek, 17.ii.1994, P. Zborowski, ANIC slide No. 3413 (all in ANIC); 25 ♂♂, 10 ♀♀, same data as holotype but 19.ii.1993, 21.ii.1993, 24.ii.1993, 18.iii.1993, 23.iii.1993, 24.iii.1993, 9.iv.1993, 10.iv.1993, 12.iv.1993, 14.iv.1993, 7.xii.1993, 18.xii.1993, 27.i.1994, 12.ii.1994, 18.ii.1994, 13.iii.1994, 16.iii.1994, 26.iii.1994, 5.xi.1994, 8.xi.1994, 27.xi.1994, 30.xi.1994, 1.xii.1994, 12.ii.1995, 14.ii.1995, 24.ii.1995, D.A. Lane; 1 ♂, Palmer River xing, Cooktown Road, 26.iv.1985, D.A. Lane; 1 ♂, Chillagoe, 28.ii.1989, D.A. Lane; 1 ♂, Chillagoe, 20.i.1988, M.S. Moulds; 1 ♂,



Fig. 1. *Opodiphthera excavus*, holotype male, upper and undersides.



Fig. 2. *Opodiphthera excavus*, paratype female, upper and undersides.

8 km E Emuford, 30.xii.1989, M.S. Moulds; 20 ♂♂, 10 ♀♀, all labelled 7 km NE Walkamin, bred/pupa, but dated 7.x.1994, 8.x.1994, 10.x.1994, 14.x.1994, 17.x.1994, 19.x.1994, 20.x.1994, 22.x.1994, 24.x.1994, 26.x.1994, 28.x.1994, 29.x.1994, 7.xi.1994, 8.xi.1994, 9.xi.1994, 10.xi.1994, 11.xi.1994, 29.xi.1994, D.A. Lane (all in D.A. Lane collection, Atherton); 1 ♂, 1 ♀, same data but dated 7.x.1994, 8.x.1994 (in Queensland Museum). NORTHERN TERRITORY: 1 ♂, 11°01'S 136°45'E, Rimbija Island, Wessel Islands, 5.i.1977, E.D. Edwards (in ANIC).

Other material examined. QUEENSLAND: 1 ♀, Walkers Creek, near Normanton, 15.i.1991, M.S. Moulds (in D.A. Lane collection, Atherton).

Description

Male (Fig. 1). Forewing length 47-50 mm. Eyes black. Antennae broadly pectinate, pectinations about 10 times width of shaft. Head, thorax and abdomen all dark reddish brown.

Upperside: Forewing with costa straight for basal 2/3 then evenly but broadly bowed to apex; apex broadly rounded, termen concave, hindmargin straight and tornus rounded. Hindwing with termen evenly rounded, inner margin straight. Both wings dark reddish-brown with little variation in colour. Some specimens have a purplish suffusion giving a glossy appearance. Forewing with a cloudy whitish-grey area near costa from postmedian band to near apex, somewhat variable in size. A slightly wavy diffuse grey or red-grey line runs from the costa at 2/3 to about half inner margin, convex in upper half and slightly concave in lower half varying to nearly straight. A similar grey line, less distinct, from a little less than half costa to 1/3 inner margin and strongly indented below cell. Eye spot at end of cell small, transparent, ringed by a narrow greyish-white line. Hindwing with outer diffuse reddish-grey line running parallel to wing margin, inner diffuse reddish-grey line indistinct; eyespot an indistinct reddish-grey spot.

Underside: Similar to upperside but markings less distinct, the inner line absent. Forewing outer line closer to wing margin posteriorly; eyespot minute, transparent, without a surrounding line. Hindwing with outer line closer to wing margin than on upperside.

Female (Fig. 2). Forewing length 50-53 mm. Antennae with pectinations about 5 times width of shaft. Fore and hind wings as in male but broader and lighter in colour. Eyespots slightly larger, the cloudy white area near forewing apex absent.

Male genitalia (Fig. 3). Uncus blunt at apex, downcurved. Valva broad, short and triangular with a broadly rounded tip; dorsal lobe broad, downcurved with pointed apex.

Etymology. The specific name is derived from the Latin *ex*, out of and *cavus*, a hollow or hole. It is treated as a noun in apposition and refers to the larval habit of burrowing into the soil to pupate.



Fig. 3. *O. excavus*, male genitalia, ANIC slide 3413.

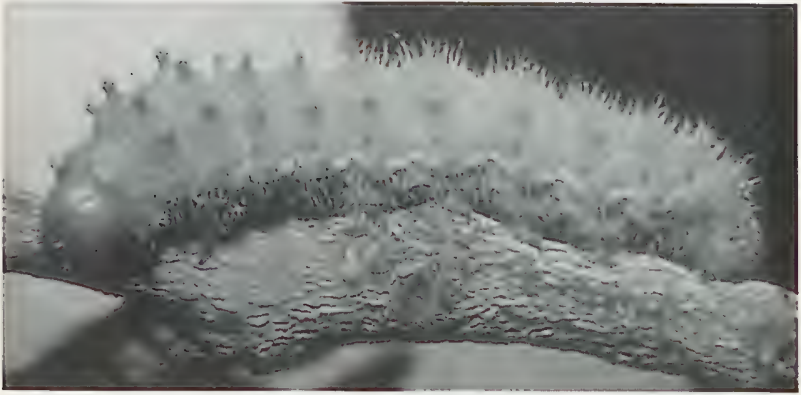


Fig. 4. *O. excavus*, mature larva, lateral view, on stem of hostplant.

Early stages and biology

Fifth instar larva (Fig. 4). Fairly stout, nearly uniformly green, with a covering of fine, whitish, secondary setae. Head smooth, green. Thorax with prothoracic shield green, meso- and metathorax with one dorsal and one subdorsal scolus on each side and one smaller lateral scolus; scoli green at base, shading to brown apically and with numerous fine whitish setae; thoracic legs dark greenish brown. Abdomen with segments 1-7 and 9 having one dorsal and one subdorsal scolus on each side and one smaller scolus below spiracle; scoli green at base, shading to dark green apically and with numerous fine whitish setae; segment 8 with one middorsal scolus and one subdorsal and one smaller lateral scolus on each side; segments 1-8 with a yellow lateral line connecting the lateral scoli; spiracles elliptical, orange; prolegs with numerous fine whitish setae; ventral prolegs stout, dark green; anal prolegs very stout, dark green. A covering of fine whitish secondary setae gives the larva a hairy appearance.

Parasitism. Several larvae of *O. excavus* collected at Wolfram Camp were found to be parasitised by a wasp, *Brachymeria* sp. (Chalididae) or by a tachinid fly (specimens deposited in ANIC), one larva being parasitised by both species.

Pupation. When ready to pupate mature larvae moved down the trunk of the host and immediately began to burrow into the soil around the base. At Wolfram Camp and near Walkamin the host grew on the sides of a low ridge, in a decomposed granite soil with soil fragments ranging from fairly coarse to a sandy loam. Such soil types are fairly friable, giving such a large larva reasonable accessibility. Larvae generally sought a pupation site within 30 cm from the base of the tree and burrowed to a depth of 40-50 mm below the surface to pupate. Pupae were located against the base of the tree, against or below buried or partly buried fallen sticks and branches, or freely scattered within the soil. They were always orientated with the anterior end uppermost, allowing the moth to reach the surface upon eclosion.

Cocoons are formed of a fairly tough silk, are oval in shape and fairly similar to, but not as rigid as those of other *Opodiphthera* species (Common 1990, Lane 1994). The cocoon is spun below the surface of the soil and incorporates small stones and soil particles, which enables it to blend into its surroundings. When digging for pupae, cocoons were often detected by touch rather than by sight. Adult emergence occurred after good rain, associated with hot, humid weather.

Distribution

Known from the far northern coast of the Northern Territory and in northern Queensland from Batavia Downs south to Ravenshoe and from near Cooktown to Mt Surprise, Georgetown and Normanton.

Discussion

This new species is best placed in *Opodiphthera* as the dorsal lobes of the male genitalia resemble those of other members of the genus; however *O. excavus* is not closely related to any of the other described species. The shape of the fore and hind wings and the reduced eyespots separate it from all others in the genus.

The female collected at Walkers Creek near Normanton is much paler in ground colour than females from other localities and is included tentatively until further specimens from the Normanton area become available.

Two males were collected at light in August and September, but all other specimens were collected or emerged from pupae during the period October to April. As larvae have only been observed in the wild during February, this suggests that the species has an annual life cycle. From 70 pupae collected at Wolfram Camp during February 1993, 29 emerged during Feb.-April 1993 or Dec. 1993-March 1994, suggesting that at least 50% of pupae lie dormant for 12 months or longer, giving the species the capacity, should dry conditions prevail, of having at least a two-year life cycle. Larvae and pupae were found associated only with mature trees and late instar larvae fed only on mature foliage. As the hostplant *E. chlorostachys* has a wide distribution in northern Australia, from north eastern Queensland to the Kimberley area of Western Australia (Boland *et al.* 1984), *O. excavus* may well have a much wider distribution than present records indicate.

The larval habit of tunnelling into the soil to pupate has not been recorded previously in the subfamily Saturniinae, although this behaviour is known to occur in the exotic subfamily Citheroniinae (Common 1990). Larvae live and pupate singly, but may be locally common when seasonal conditions (summer storms associated with hot humid weather) give rise to many emergences within a few days. In general, *O. excavus* appears to be fairly local in distribution, often selecting only old mature trees on which to oviposit. Aggregations of pupae at the base of certain trees can be fairly prolific, however the remains of many emerged pupal cocoons from several previous seasons may give a false impression of the relative abundance of the moth. The habit of the larvae in entering the soil to spin cocoons and pupate is of special interest and undoubtedly provides protection from bushfires and desiccation in a harsh environment.

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